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Dr. Middleton PHYS 132 HW

4-3-17

Ch. 33

CQ: 1,2

P: 2,3

Problems

33.P.2

$$\Delta V = 0.050 \text{ V}$$

$$l = 0.1 \text{ m}$$

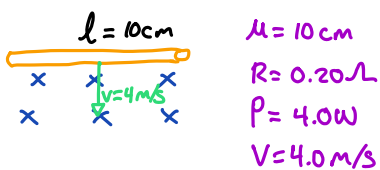
$$v = 5.0 \text{ m/s}$$

$$\mathcal{E} = v l B$$

$$B = \frac{\mathcal{E}}{vl} = \frac{0.050 \text{ V}}{(5.0 \text{ m/s})(0.1 \text{ m})} = 0.1 \text{ T}$$

$B = 0.1 \text{ T}$
out of page

33.P.3



a.) $P = \frac{v^2 l^2 B^2}{R}$

$$B = \sqrt{\frac{PR}{v^2 l^2}}$$

$P = 4.0 \text{ W}$
 $R = 0.20 \Omega$
 $v = 4.0 \text{ m/s}$
 $l = 0.1 \text{ m}$

$$B = 2.23 \text{ T}$$
$$F = 1 \text{ N}$$

$$B = \sqrt{\frac{(4.0 \text{ W})(0.20 \Omega)}{(4.0 \text{ m/s})^2 (0.1 \text{ m})^2}} = 2.23 \text{ T} \quad B = 2.23 \text{ T}$$

b.) $f = \frac{v l^2 B^2}{R}$

$$v = 4.0 \text{ m/s}$$

$$l = 0.1 \text{ m}$$

$$B = 2.23 \text{ T}$$

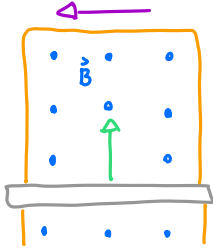
$$R = 0.20 \Omega$$

$$f = \frac{(4.0 \text{ m/s})(0.1 \text{ m})^2 (2.23 \text{ T})^2}{(0.20 \Omega)} = 0.995 \text{ N} \approx 1 \text{ N}$$

$$f = 1 \text{ N}$$

Conceptual

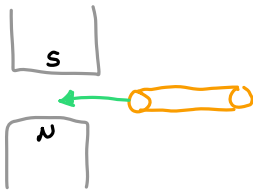
33.CQ.1]



$$F = I\ell \times \vec{B}$$

Due to the right hand rule, there is a current flowing CCW in the given circuit.

33.CQ.2]



The movement of the ring is to the left with the flux increasing. This means that there is an induced current that counteracts this change in the opposite direction, meaning that you would have to push due to a repulsive force to the right.